

Pengawasan Penyakit Menular

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Pengawasan Penyakit Menular

A **communicable** (or **infectious**) **disease** is an illness due to the **transmission** of a specific **infectious agent** (or its toxic products) from an infected person, animal or inanimate source to a susceptible host, either **directly** or **indirectly**

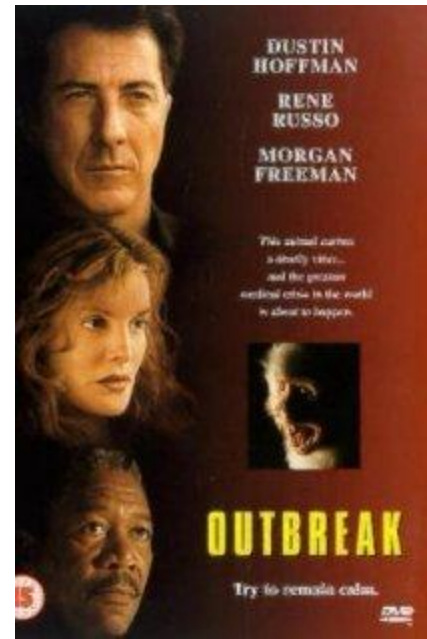


Epidemic: 'the occurrence in a community or region of cases of illness (or an **outbreak**) with a frequency clearly in excess of normal expectancy'.

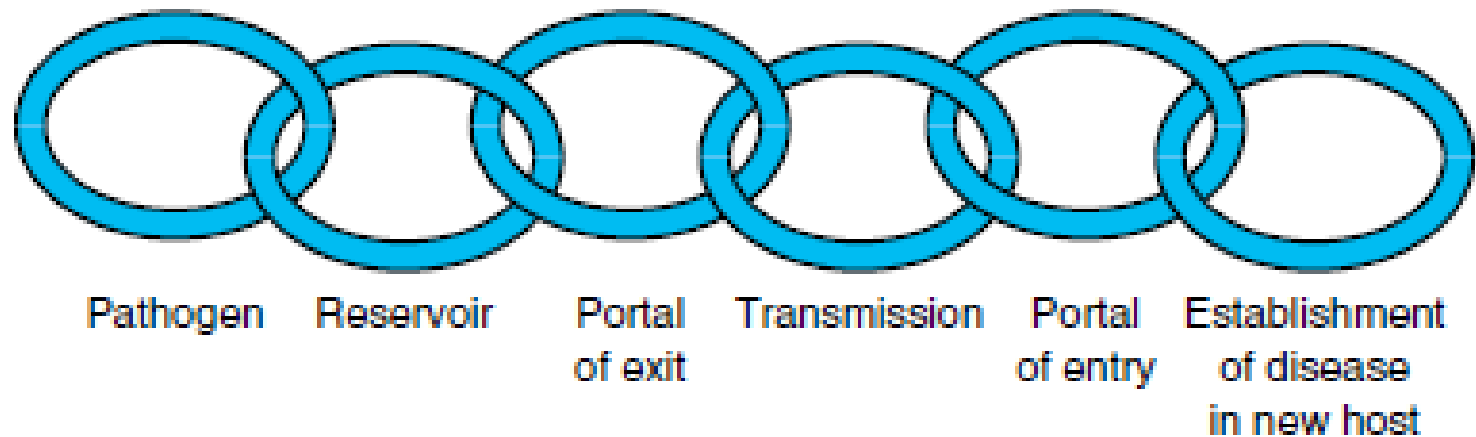
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The term **outbreak** is often used to describe any of the following:

- *Two or more related (i.e. epidemiologically-linked) cases of a similar disease*
- *An increase in the observed incidence of cases over the expected incidence within a given time period*
- *A single case of a serious disease*



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Chain of infection

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Infectious disease	Deaths (millions)
Respiratory infections	3.9
Acquired immunodeficiency syndrome	2.9
Diarrhoeal disease	1.9
Malaria	1.1

WHO estimates of global mortality from infectious diseases, 2001

Communicable diseases lead to around 14.7 million deaths worldwide (26% of global mortality)

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Primary prevention: preventing disease onset

- **Eliminating the organism**
- **Environmental protection**
- **Interrupting the chain of transmission**
- **Reducing susceptibility in the host**
- **Health education and community participation**

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Secondary prevention: arresting the progression of established disease

- **Screening**
- **Outbreak/epidemic investigation**

The main aims of epidemic/outbreak investigation are to:

- **identify** the causative agent, route of transmission, and risk factors for the outbreak
- **develop** and **implement control** and prevention strategies and provide advice to prevent a similar event in the future.

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Tertiary prevention: limiting the consequences of established disease

One example of this is providing artificial limbs for a child who has needed amputations following severe meningococcal septicaemia

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Key elements of outbreak/epidemic investigation and management

Establish that there really is an outbreak

Confirm the diagnosis

Create a case definition

Find and count cases

Draw an epidemic curve

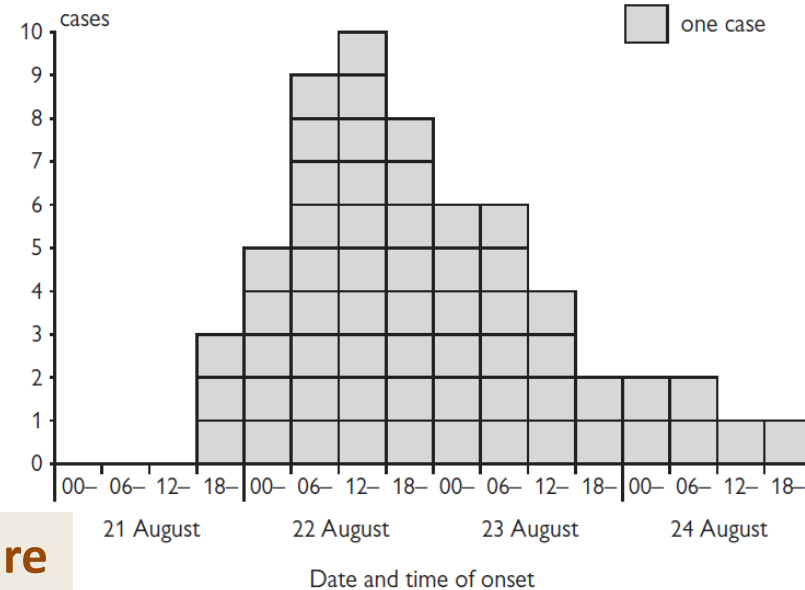
Determine who is at risk

Generate and test hypotheses for exposure

Consider what additional evidence is needed

Implement control measures

Write up your findings

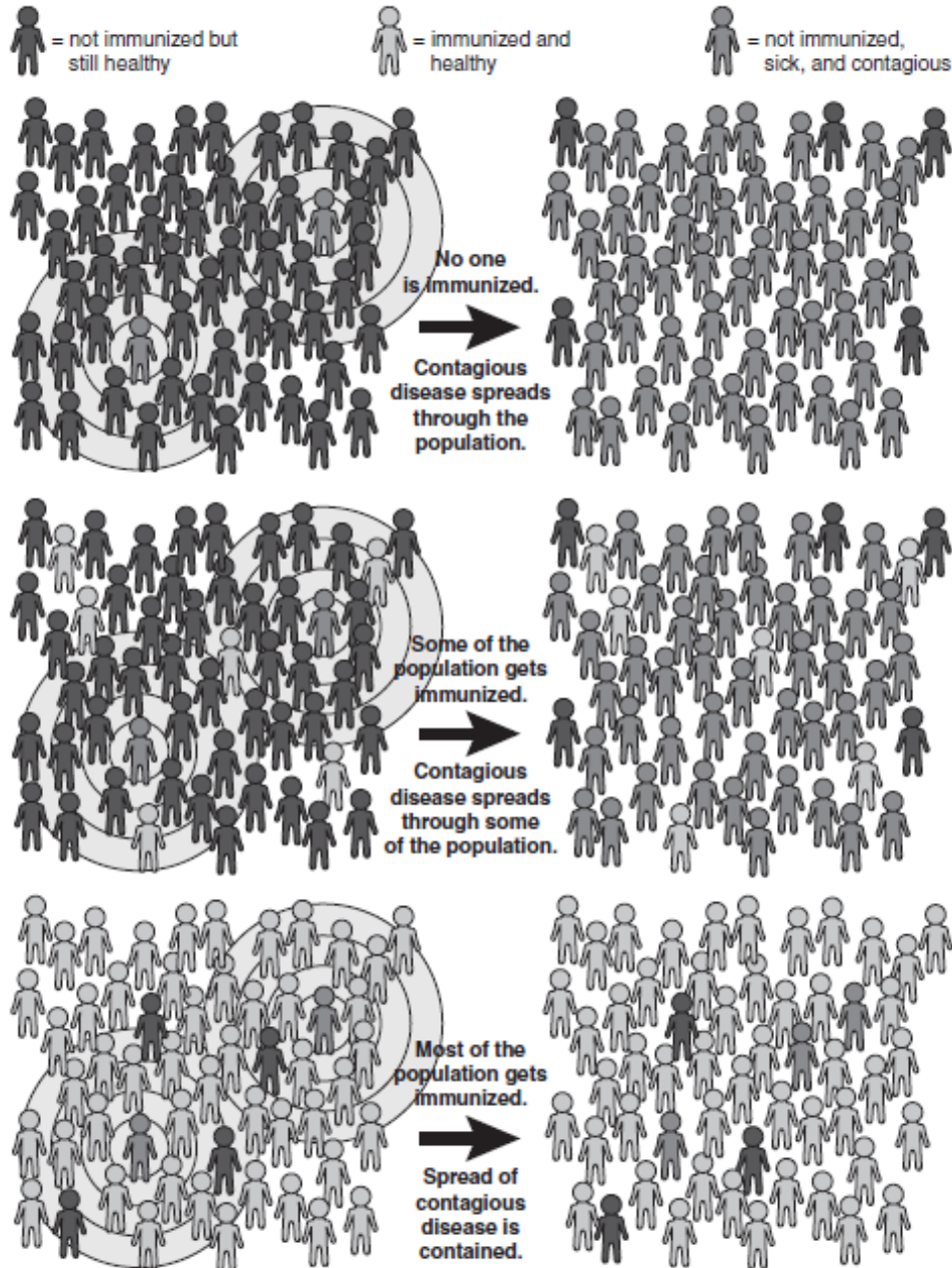


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	WITHOUT VACCINATION PROGRAM				PREVENTED OR SAVED BY VACCINATION PROGRAM			
	Cases (No.)	Deaths (No.)	Direct Costs (Million \$)	Total Costs (Million \$)	Cases (No.)	Deaths, No.	Direct Costs (Million \$)	Total Costs (Million \$)
Diphtheria	247,214	24,721	2,358	24,930	247,212	24,721	2,358	24,930
Tetanus	153	23	8	29	146	22	8	28
Pertussis	2,662,307	1,049	2,265	3,668	2,614,874	1,008	2,193	3,545
<i>Haemophilus influenzae</i> type b	17,530	663	1,434	2,696	17,469	661	1,430	2,689
Poliomyelitis	60,974	723	2,084	4,890	60,974	723	2,084	4,890
Measles	3,493,722	2,795	2,646	5,875	3,433,036	2,794	2,645	5,874
Mumps	2,100,718	11	936	1,459	2,095,917	11	934	1,456
Rubella	1,786,334	14	88	381	1,784,030	14	88	380
Congenital rubella syndrome	616	68	115	173	602	66	112	169
Hepatitis B	232,001	3,427	168	1,272	207,353	3,024	149	1,121
Varicella	3,788,807	70	205	1,184	3,160,391	57	173	993
Total	14,330,376	33,564	12,307	46,557	13,622,004	33,101	12,174	45,075

HEALTH AND ECONOMIC OUTCOMES FOR SELECTED VACCINE-PREVENTABLE DISEASES WITH AND WITHOUT A VACCINATION PROGRAM

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Vaccine-preventable disease

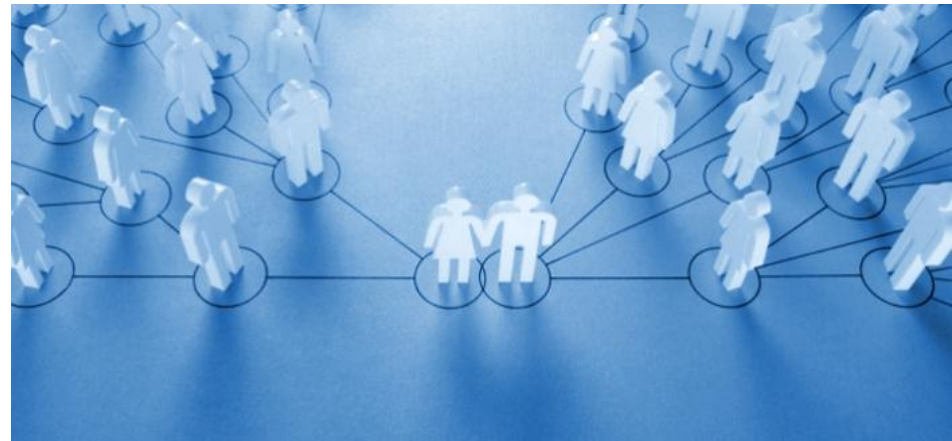
- Perinatal hepatitis B
- Tuberculosis
- Measles
- Polio
- Smallpox

Other communicable disease

- Malaria
- Schistosomiasis
- Leishmaniasis
- Filariasis
- Human trypanosomiasis
- Leprosy

Emerging diseases

- Pandemic Influenza
- Avian influenza
- SARS
- HIV/AIDS



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Vaccine-preventable disease

- Perinatal hepatitis B
 - One of the notifiable infectious diseases monitored by the National Notifiable Diseases Surveillance System (NNDSS)
 - cause of acute and chronic hepatitis and cirrhosis
 - cause of up to 80% of hepatocellular carcinoma
 - > 350 million persons are chronically infected worldwide
 - over 1,000,000 deaths in 2013 from hepatitis B infection

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Vaccine-preventable disease

- Perinatal hepatitis B

- The virus is transmitted through blood or other bodily fluids, and it is 50 to 100 times more infectious than HIV
- Approximately 10% of all acute HBV infections progress to chronic infection with the risk of chronic HBV infection decreasing with age
- 90% of infants who acquire HBV infection from their mothers at birth become chronically infected, or carriers
- Of children who become infected with HBV between 1 and 5 years of age, 30% to 50% become carriers.

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Vaccine-preventable disease

- Perinatal hepatitis B

Preventing perinatal HBV transmission is an integral part of the national strategy to eliminate Hepatitis B in the United States. National guidelines call for the following:

- ☐ Universal screening of pregnant women for HBsAg during each pregnancy,
- ☐ Case management of HBsAg-positive mothers and their infants,
- ☐ Provision of immunoprophylaxis for infants born to infected mothers, including Hepatitis B vaccine and Hepatitis B immune globulin [sic],
- ☐ Routine vaccination of all infants with the Hepatitis B vaccine series, with the first dose administered at birth. (CDC, 2012a)

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Vaccine-preventable disease

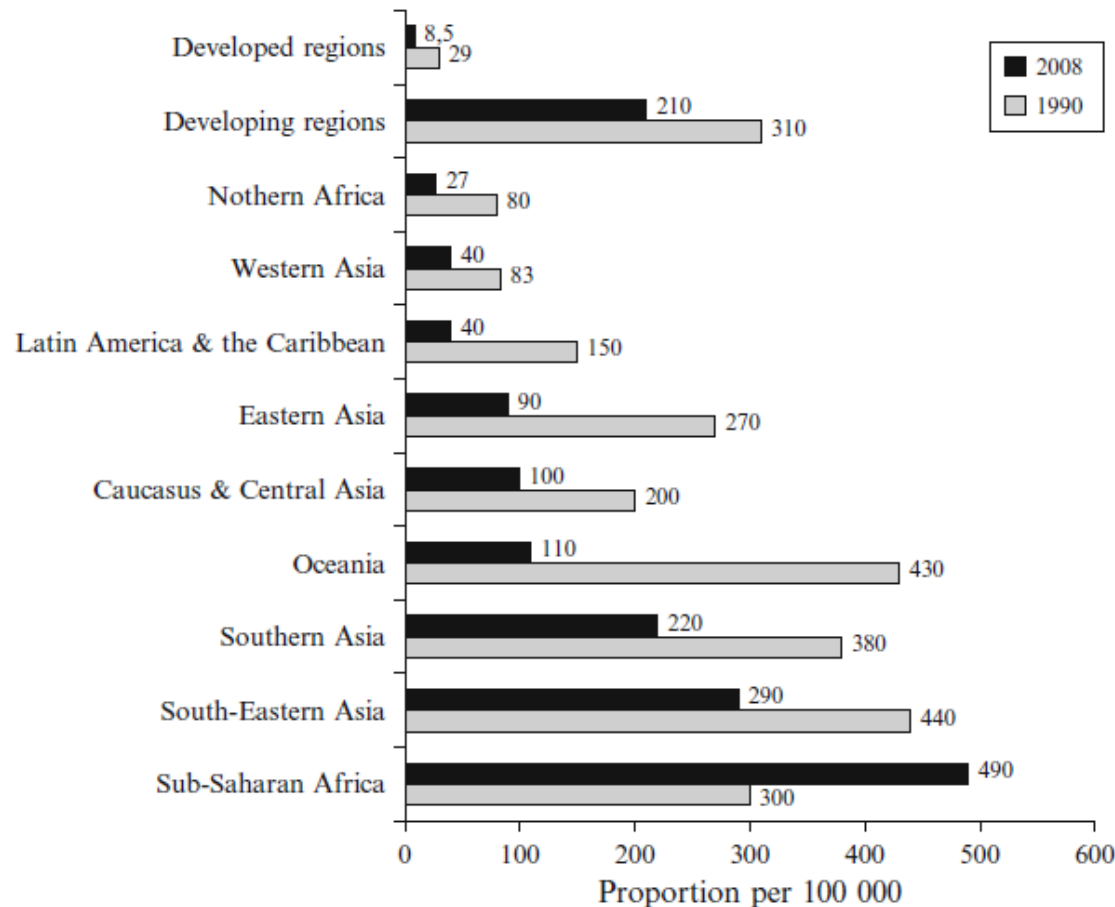
- Tuberculosis

- Nearly 2 billion people worldwide are currently infected with tuberculosis.
- Every year, between 8 - 10 million people contract the disease and nearly 2 million die of tuberculosis
- In 2008, there were 11 million reported cases of tuberculosis worldwide, including over 80 % in sub-Saharan Africa and Asia
- India, China, Indonesia, South Africa and Nigeria have the highest number of TB cases

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Vaccine-preventable disease

- Tuberculosis



Tuberculosis prevalence (per 100,000 population) by WHO region, 1990 and 2008 (including people who are HIV-positive) (Source: United Nations 2010)

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Vaccine-preventable disease

- Tuberculosis

- Caused by the organism *Mycobacterium tuberculosis*
- Latent tuberculosis infection: carrying inactive bacilli
 - Diagnosis: tuberculin skin test (TST), blood test (QuantiFERON, T - SPOT.TB)
- Pulmonary TB, extrapulmonary TB, miliary TB
- Diagnosis of active TB: based on risk factors for the disease, the clinical history of symptoms, an abnormal chest X - ray, a positive skin test, and the presence of bacilli in the sputum, culture

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Vaccine-preventable disease

- Tuberculosis

- Treatment:
 - Slow-growing bacteria: regimens 6 months or longer
 - Disease tends to recur if discontinued too early
 - Multiple drugs are required to prevent drug resistance
 - Standard regimens: isoniazid, rifampin, pyrazinamide, and ethambutol
- Compliant patients who complete therapy can be cured in over 95 percent of cases
- When left untreated, the risk of death approaches 50 percent

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Vaccine-preventable disease

- Measles



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Vaccine-preventable disease

- Measles

- One of the leading causes of death among young children
- In 2013: 145 700 measles deaths globally
- Measles vaccination resulted in a 75% drop in measles deaths between 2000 and 2013 worldwide.
- In 2013: 84% of the world's children received one dose of measles vaccine by their first birthday through routine health services – up from 73% in 2000
- During 2000-2013, measles vaccination prevented an estimated 15.6 million deaths

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Vaccine-preventable disease

- Polio



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Vaccine-preventable disease

- Polio

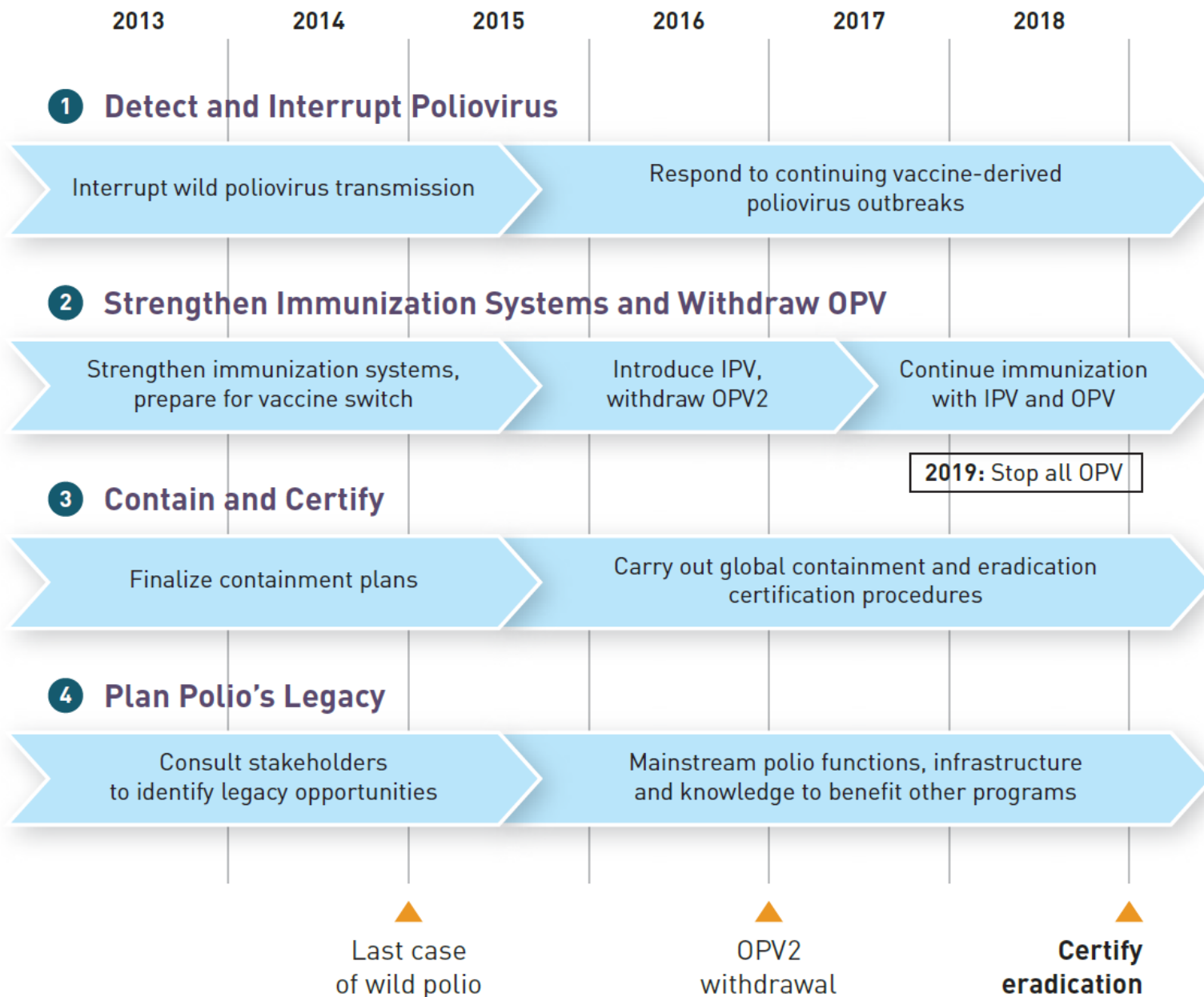
- Polio (poliomyelitis) mainly affects children under 5 years of age.
- One in 200 infections leads to irreversible paralysis. Among those paralyzed, 5% to 10% die when their breathing muscles become immobilized.
- Polio cases have decreased by over 99% since 1988, from an estimated 350 000 cases then, to 416 reported cases in 2013. The reduction is the result of the global effort to eradicate the disease.
- In 2014, only 3 countries (Afghanistan, Nigeria and Pakistan) remain polio-endemic, down from more than 125 in 1988.

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Vaccine-preventable disease

- Polio
 - 1955: Jonas Salk developed an oral polio vaccine that contained live attenuated poliovirus
 - 1963: Albert Sabin ' s inactivated oral polio vaccine

Eradication and Endgame Timeline



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Vaccine-preventable disease

- Smallpox
 - Caused by variola
 - After an **incubation period** , the time between exposure to the virus and the appearance of symptoms, of 7 – 17 days, the infected person develops fever, headache, malaise, and aches (**prodromal stage**). Rash developed, then changes into fluid-filled vesicle
 - It was declared eradicated in 1980 following a global immunization campaign led by the World Health Organization

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Vaccine-preventable disease

- Smallpox
 - Transmitted from person to person via infective droplets during close contact with infected symptomatic people
 - The last known natural case was in Somalia in 1977. Since then, the only known cases were caused by a laboratory accident in 1978 in Birmingham, England, which killed one person and caused a limited outbreak
 - Vaccine administered up to 4 days after exposure provided protective immunity and was preventing infection and lessening the severity of the disease

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Vaccine-preventable disease

- Smallpox



Edward Jenner (1749–1823) Performing the First Vaccination Against Smallpox in 1796, by Gaston Melingue (1840–1914). Used by permission from the Bridgeman Art Library.

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Vaccine-preventable disease

- Smallpox



Ali Maow Maalin, the last person to have naturally acquired smallpox

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Vaccine-preventable disease

- Smallpox
 - The destruction of all smallpox laboratory strains, initially set to occur in 1993 and then delayed until 1995, and then delayed again until 1999.
 - After that time, perceived threat of the use of smallpox as a bioterrorist weapon again caused a delay in destruction of virus stocks.
 - As of 2010, smallpox is still being studied in laboratories and debate continues on whether and when the virus stocks should be destroyed